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THOMAS R. BERTHOLD
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SARATOGA, CA 95070

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WATKO, JULIE ANNE	
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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ANDRE S. CHAN, FERDINAND HENDRIKS,
TOSHIKI HIRANO, and MANOJ KESHAVAN

Appeal 2009-006187
Application 10/788,953
Technology Center 2600

Decided: December 31, 2009

Before ROBERT E. NAPPI, MARC S. HOFF, and
BRADLEY W. BAUMEISTER, *Administrative Patent Judges*.

BAUMEISTER, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134 (2002) from the Examiner's rejection of claims 1-5, 10 and 12. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

We affirm.

Appellants' invention relates to magnetic recording hard disk drives that use disk vibration damping plates. Damping plates are used to encourage laminar air flow and thus reduce air-flow turbulence that causes unwanted disk vibrations. Known damping plates have planar surfaces and are disposed parallel to the planar surfaces of the disks and extend between the disks near their outer perimeters.

Appellants have found that known, planar damping plates also cause undesirable, high viscous shear forces on the disks. In order to reduce these viscous shear forces without losing the benefit of reduced air-flow turbulence, Appellants provide a plurality of discrete surface features (dimple, bump, or protuberance) on the damping plates' planar surfaces. The surface features are arranged in a pattern of radially-spaced concentric rings (grooves, depressions or protuberances), with each ring comprising a plurality of discrete circumferentially spaced-apart surface features. App. Br.[1] 2-3; Spec. 7, Abstract; claim 1.

[1] Throughout this opinion we refer to (1) the Supplemental Appeal Brief ("App. Br.") filed May 3, 2007; (2) the Examiner's Answer ("Ans.") mailed Feb. 11, 2008; (3) the Reply Brief ("Reply Br.") filed Sep. 22, 2007; and (4) the Supplemental Examiner's Answer ("Supp. Ans.") mailed Dec. 14, 2007.

Independent claim 1 is illustrative, reading as follows:

1. A data recording disk drive comprising:

a housing;

at least one disk rotatable about an axis of rotation;

a motor attached to the housing for rotating the disk;

a plate fixed to the housing, the plate extending circumferentially around a sector of the disk and radially across a radially outer annular region of the disk, the plate having a substantially planar surface facing a disk surface, said plate surface having a plurality of discrete surface features arranged in a pattern of radially-spaced concentric rings, each ring comprising a plurality of discrete circumferentially spaced-apart surface features.

The Examiner relies on the following prior art references to show unpatentability:

Machcha	US 6,882,501 B2	Apr. 19, 2005 (filed Nov. 30, 2000)
Butt	US 7,031,104 B1	Apr. 18, 2006 (filed Apr. 30, 2002)
Asano	US 7,072,140 B2	July 4, 2006 (filed Jan. 20, 2004)

Claim 1-3 stand rejected under 35 U.S.C. § 103(a) as obvious over Butt in view of Asano.

Claim 4, 5, 10, and 12 stand rejected under 35 U.S.C. § 103(a) as obvious over Butt in view of Asano and Machcha.

ARGUMENTS[2] AND ISSUES

The Examiner finds that Butt is directed to a data recording disk drive and discloses every limitation of claim 1 except for the last limitation (Ans. 3). That is, Butt discloses a plate surface having a plurality of discrete surface features arranged in a pattern of radially-spaced concentric rings, but each of Butt's rings is continuous instead of comprising a plurality of discrete circumferentially spaced-apart surface features (*id.*).

The Examiner further finds that Asano teaches a disk drive having an airflow adjustment mechanism that may be either (1) a continuous ridge or alternatively (2) a ridge of a plurality of discrete surface features spaced-apart in a direction of airflow (Ans. 4). The Examiner concludes that it would have been obvious to modify Butt's radially-spaced concentric rings so that each ring is composed of a plurality of discrete spaced-apart surface features instead of being continuous (*id.*). The Examiner's rationale is that a continuous ring and a ring that is made up of discrete spaced-apart surface features were two of a limited number of known functionally equivalent structures or solutions for addressing the problem of non-laminar airflow in storage disks (*id.*).

Appellants assert that combining Asano with Butt does not result in Appellants' invention as recited in the independent claims (Reply Br. 2). More specifically, Appellants assert that: (1) Asano teaches parallel lines of

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[2] Rather than repeat the arguments of Appellants or the Examiner, we refer to the Brief and the Answer for their respective details. In this decision, we have considered only those arguments actually made by Appellants. Arguments which Appellants could have made but did not make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

surface features applied to a cylindrical surface 36a that is oriented perpendicular to the disk surfaces and extends beyond the outer perimeters of the disks (*id.*); (2) Asano's surface features are aligned as parallel lines because they are located on the surface of a flexible adhesive tape that is applied to the disk drive's cylindrical wall (Reply Br. 2-3); (3) "[i]t is not physically possible for the adhesive tape of Asano to be applied to the disk drive of Butt, or any disk drive, in a manner that would result in '*concentric rings* . . . comprising a plurality of discrete *circumferentially* spaced-apart surface features'" (Reply Br. 3); and (4) "if the adhesive tape of Asano were to be applied to a surface parallel to the disk surfaces of Butt, the result would be *parallel lines of surface features extending perpendicular to a disk radius*" (*id.*).

The first issue, then, is: Have Appellants shown that the Examiner erred in finding that the combined teachings of Butt and Asano reasonably suggest a plate surface for a data recording disk drive having a plurality of discrete surface features arranged in a pattern of radially-spaced concentric rings, each ring comprising a plurality of discrete circumferentially spaced-apart surface features?

Appellants next allege that various assertions made by the Examiner to support the obviousness rejection are incorrect (Reply Br. 3). For example, Appellants allege that the Examiner incorrectly concludes that Asano is directed to the same problem as Appellants' invention. Appellants contend that Asano addresses the problem of non-laminar air-flow at the cylindrical wall perpendicular to and beyond the outer perimeters of the rotating disks, while Appellants' invention is alternatively directed towards the problem of viscous shear forces above and below the surfaces of the

rotating disks (Reply Br. 3-4)—not the reduction of non-laminar air-flow above and below the rotating disks (Reply Br. 5).

Appellants further argue that one skilled in the art would not have combined Asano and Butt to provide surface features above and below surfaces of rotating disks for the purpose of increasing laminar flow because Appellants' Specification indicates that laminar flow is alternatively achieved by making the plates with planar surfaces (Reply Br. 4). Appellants also allege that providing circumferential grooves alternatively increases the turbulence (*id.*). As such, providing spaced apart surface features on a planar surface "is neither a 'known option within [the skilled artisan's] technical grasp', nor a 'predictable, equivalent solution to the problem of non-laminar airflow'" (*id.*).

The second issue, then, is: Have Appellants shown that the Examiner erred in finding that the combined teachings of Butt and Asano evidence that circumferentially spaced apart surface features and circumferential continuous ridges on the surface of recording disk damping plates constitute known functionally equivalent solutions for reducing non-laminar flow between the disks and damping plates?

FINDINGS OF FACT

The record supports the following Findings of Fact (FF) by a preponderance of the evidence:

Butt

1. The object of Butt's invention is to decrease turbulent (or non-laminar) flow of air in the space between a surface of a disk drive's rotating

disks and a portion of an enclosure that is stationary with respect to the disks (col. 1, l. 45 – col. 2, l. 3).

2. Butt achieves this objective by disposing arcuate channels on the surfaces of components of the disk drive's housing or enclosure (col. 3, l. 56 – col. 4, l. 38; col. 5, ll. 33-60). The arcuate channels are disposed generally parallel to an outer circumference of the disk drive's rotating disks (*id.*).

3. The arcuate channels may be formed onto or within the stationary surface by various known processes. The processes expressly disclosed include stamping, casting, welding, and attaching walls to the stationary surface with an adhesive (col. 4, ll. 45-53).

Asano

4. Asano teaches a disk drive that includes a thin plate member attached at one or more desired locations to an inner wall surface defining a recess of the disk drive casing (Abstract; col. 7, ll. 24-43). The thin-plate member, which is flexible and includes a substrate, an adhesive, and a plurality of minute protrusions formed on the adhesive, promotes laminar flow and "reduces an interfacial friction caused between the inner wall surface [ ] of the casing and the airflow generated around the storage disk [ ] in rotation" (Abstract; col. 5, l. 62 – col. 6, l. 2; col. 6, l. 61- col. 7, l. 3; col. 7, ll. 24-43).

5. The minute protrusions of the thin-plate member may be configured of variously-shaped ridges that extend in a direction substantially parallel to each other and to the recording surface (col. 5, ll. 44-61; col. 7, ll. 53-56; Figs. 3, 4a-4e). The minute protrusions may alternatively be configured of, for example, a plurality of

pyramidal protrusions or mushroom-shaped headed elements (col. 6, ll. 57-61; Figs. 5-7).

6. The flexible thin plate member may be positioned on the cylindrical side surface of the disk drive casing (col. 5, l. 62 – col. 6, l. 2; Figs. 1-2). In this configuration the thin-plate member

> minimizes the friction of the surface in contact with the airflow generated by the rotation of the storage disks [ ] on the side surface area [ ] of the inner wall surface [ ] of the casing in opposed relation to the outer peripheral edges [ ] of the plurality of the storage disks [ ], with the result that the airflow along the side surface area [ ] is smoothly guided and stabilized substantially into a laminar flow.

(col. 5, l. 62 – col. 6, l. 2). The flexible thin plate member may be alternatively positioned on the top and/or bottom inner wall surfaces of the disk drive casing, respectively in opposed relation to the upper and/or lower surfaces of the storage disk (col. 7, ll. 25-43; Fig. 8). In this configuration

> the thin-plate member [ ] works to minimize the friction of the surface in contact with the airflow generated by the rotation of the storage disks [ ] on the bottom surface [ ] or the top surface area [ ], as the case may be, of the inner wall surface [ ] of the casing in opposed relation to the recording surface [ ] of the plurality of the storage disks [ ] and thereby stabilizes the airflow substantially into a laminar flow, whereby the effect that the vibration or the like caused by the airflow has on the storage disks [ ] can be very effectively suppressed.

(col. 7, ll. 34-43).

Appellants' Specification

7. TABLE 1 of Appellants' Specification sets forth the following data:

TABLE 1

plate thickness t (mm)	w_G (mm)	w_R (mm)	w_G:w_R	viscous torque (N-m x 10^{-3})	eddy viscosity (kg-s/m x 10^{-4})
0.97 (planar-surface plate)	0	0	NA	1.44	1.602
0.97	0.575	2.3	1:4	1.41	1.695
0.97	1.15	1.725	2:3	1.39	1.716
0.97	1.725	1.15	3:2	1.35	1.770
0.97	2.3	0.575	4:1	1.33	1.807
0.57 (planar-surface plate)	0	0	NA	1.30	2.012
0.0 (no plate)	—	—	—	3.87	2.491

TABLE 1 sets forth "a large-scale numerical [software] simulation of disk drive internal aerodynamics [that] was performed for various designs of [Appellants'] damping plate" (Spec. 5).

PRINCIPLES OF LAW

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988). If the Examiner's burden is met, the burden then shifts to the Appellants to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. *See In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

ANALYSIS

I.

The first issue is: Have Appellants shown that the Examiner erred in finding that the combined teachings of Butt and Asano reasonably suggest a plate surface for a data recording disk drive having a plurality of discrete surface features arranged in a pattern of radially-spaced concentric rings, each ring comprising a plurality of discrete circumferentially spaced-apart surface features? We find that Appellants have not.

The object of Butt's invention is to decrease turbulent (or non-laminar) flow of air in the space between surfaces of a disk drive's rotating disks and a portion of an enclosure that is stationary with respect to the disks (FF 1). Butt achieves this objective by disposing arcuate channels on the surfaces of components of the disk drive's housing or enclosure (FF 2). The arcuate channels are disposed generally parallel to an outer circumference of the disk drive's rotating disks (*id.*). Asano teaches that damping plate ridges (or "minute protrusions") for adjusting air-flow turbulence over magnetic storage disks may be positioned either on the cylindrical side surface, or alternatively on the top and/or bottom inner wall surfaces, of the disk drive casing (FF 6). Asano also teaches that the minute protrusions may be configured either as continuous ridges or alternatively as discrete spaced-apart elements (FF 5).

We understand the Examiner to be relying on Asano for teaching that features disposed on surfaces parallel to recording disk surfaces may be either continuous or composed of discrete features. The Examiner is not relying on Asano for additionally teaching that the surface features may be arranged in a pattern of radially-spaced concentric rings. Butt, itself,

discloses this feature. Therefore, we do not see why Asano's additional disclosure, that its surface features are specifically parallel, would render the Examiner's rationale deficient.

"The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference. . . . Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). *See also In re Sneed*, 710 F.2d 1544, 1550 (Fed. Cir. 1983) ("[I]t is not necessary that the inventions of the references be physically combinable to render obvious the invention under review."); and *In re Nievelt*, 482 F.2d 965, 968 (CCPA 1973) ("Combining the *teachings* of references does not involve an ability to combine their specific structures."). Rather, "if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007). Moreover, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. *See In re Keller*, 642 F.2d 413, 426 (CCPA 1981); *In re Merck & Co.*, Inc., 800 F.2d 1091, 1097 (Fed. Cir. 1986).

We are also unpersuaded by Appellants' arguments that it was not physically possible to apply Asano's flexible adhesive tape to the surfaces of Butt's drive enclosure in a manner that would result in concentric rings (Reply Br. 3). Appellants provide no basis or evidence to support the conclusion that such a modification was not physically possible at the time

of the invention. It is well settled that arguments of counsel cannot take the place of factually supported objective evidence. *See e.g., In re Huang*, 100 F.3d 135, 139-40 (Fed. Cir. 1996); *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984). In fact, Butt itself expressly discloses that the arcuate channels (or concentric rings) may be attached to the stationary surfaces with an adhesive (FF 3). As such, Butt refutes Appellants' argument that it was not physically possible to use adhesives to arrange discrete surface features specifically in concentric rings.

II.

Appellants argue that their invention relates to the problem of viscous shear forces, while Asano relates to non-laminar air-flow. This argument is not persuasive. Independent claim 1 does not recite any structures or structural relationships that would expressly, implicitly, or inherently distinguish the claimed plate surface features from features that are alternatively or additionally provided on a plate surface to reduce non-laminar flow. That is, claim 1 is broad enough to read on disk drive damping plates that have surface features arranged in the claimed orientation, but for the alternative purpose of reducing non-laminar flow. It is well settled that although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

The remaining question, then, is: Have Appellants shown that the Examiner erred in finding that the combined teachings of Butt and Asano evidence that circumferentially spaced apart surface features and circumferential continuous ridges on the surface of recording disk damping

plates constitute known functionally equivalent solutions for reducing non-laminar flow between the disks and damping plates? We find that Appellants have not.

Butt discloses that the object of placing circumferential continuous ridges on a surface of stationary enclosure that is parallel to a rotating disk drive is to decrease turbulent (or non-laminar) air-flow in the space between a surface of a disk drive's rotating disks and a portion of an enclosure that is stationary with respect to the disks (FF 1). Asano teaches that minute protrusions may be configured either as continuous ridges or alternatively as discrete spaced-apart elements (FF 5). Asano also teaches that damping plate ridges for adjusting air-flow turbulence over magnetic storage disks may be positioned either on the cylindrical side surface, or alternatively on the top and/or bottom inner wall surfaces, of the disk drive casing (FF 4, 6). Accordingly, we find Appellants' argument—that providing spaced apart surface features on a planar surface "is neither a 'known option within [the skilled artisan's] technical grasp', nor a 'predictable, equivalent solution to the problem of non-laminar airflow'" (Reply Br. 4)—to be unpersuasive.

We also find unpersuasive Appellants' argument that TABLE 1 of Appellants' Specification indicates "that surface features on the planar surfaces of the damping plates would actually increase non-laminar air-flow" (Reply Br. 4). The eddy viscosity data of TABLE 1 does indicate that providing damping plates with surface features (TABLE 1, rows 2-5) increases turbulence *relative to planar damping plates* (TABLE 1, rows 1 and 6). However, the data further evidences that providing damping plates with surface features reduces turbulence *relative to having no damping plates* (TABLE 1, row 7). Thus, the data of TABLE 1 does not support

Appellants' assertion that "to one skilled in the art of disk drive air-flow, surface features on a planar surface is neither a 'known option within her or his technical grasp', nor a 'predictable, equivalent solution to the problem of non-laminar airflow" (Reply Br. 4).

For the foregoing reasons, Appellants have not persuaded us of error in the Examiner's obviousness rejection of independent claim 1. Accordingly, we will sustain the Examiner's rejection of that claim and claims 2 and 3 which depend therefrom.

With respect to the remaining rejection of claims 4, 5, 10, and 12, Appellants provide no patentability arguments regarding the additionally cited reference, Machcha (Reply Br. 2-5). Rather, Appellants solely argue why the combination of Butt and Asano do not render independent claims 1 and 4 obvious (*id.*). Accordingly, for the reasons discussed above, we also sustain the rejections of claims 4, 5, 10 and 12.

CONCLUSIONS

Appellants have not shown that the Examiner erred in finding that the combined teachings of Butt and Asano reasonably suggest a plate surface for a data recording disk drive having a plurality of discrete surface features arranged in a pattern of radially-spaced concentric rings, each ring comprising a plurality of discrete circumferentially spaced-apart surface features.

Appellants have not shown that the Examiner erred in finding that the combined teachings of Butt and Asano evidence that circumferentially spaced apart surface features and circumferential continuous ridges on the surface of recording disk damping plates constitute known functionally

equivalent solutions for reducing non-laminar flow between the disks and damping plates.

Appellants have not shown that the Examiner erred in rejecting claims 1-5, 10, and 12 under 35 U.S.C. § 103.

DECISION

We sustain the Examiner's rejections with respect to all pending claims on appeal. Therefore, the Examiner's decision rejecting claims 1-5, 10, and 12 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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